nanocomposites which is indeed a hybrid of solution mixing and melts mixing. It was found that the layered silicates at very low loadings (5 phr) could give the reinforcement given by traditional fillers like titanium dioxide at higher loadings. This improves the processability of rubber nanocomposites since the major difficulty in preparing the rubber nanocomposites include the addition of filler in high loadings. The mechanical properties at very low filler loadings (5 phr) correspond to the enhanced interaction between the filler and the chlorobutyl rubber matrix due to intercalation and exfoliation of the layered silicates. The use of different clays with varying d spacing has helped to identify the apt layered silicate for the chlorobutyl rubber matrix and also paved way for the tailoring of the properties of the nanocomposites. It is clearly substantiated by the study that with the increase in the d spacing of the layered silicates the efficiency of intercalation/exfoliation is increased and the property enhancement is obtained beyond prediction. This exactly justifies for the superior performance of cloisite 15 A. Cloisite 15 A as well as 10 A are effective materials as fillers in the chlorobutyl rubber matrix for the decrease in the gas barrier properties. Cloisite 15 A excels in all the properties shown by the nanocomposites when compared to the other two layered silicate moieties. The properties shown by cloisite 20 A is found to be less than the other two varieties of layered silicates. The study also helps in the comparison of the nature of the different fillers like nanocalcium phosphate , titanium dioxide and layered silicates and has helped in understanding the difference in the behaviour of various fillers in the matrix. The dynamic mechanical analysis shows the decrease in the tan delta peaks with the increase in filler loading which substantiates the use of chlorobutyl rubber nanocomposites as effective damping materials. Moreover the layered silicate reinforced nanocomposites exhibit superior transport properties like resistance to the penetration of chemicals which make them an important component in the fabrication of chemical protective clothing. The enhanced gas barrier properties exhibited by these materials enable them to be used as barrier materials in a variety of industrial as well as advanced applications. The working times calculated throw light into the effectiveness of the material to be used as potential VOC barrier membranes.

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